

## **ABSTRACT**

In the present invention, in a direct-injection spark ignition internal combustion engine, an air-fuel mixture mass of appropriate density and size is formed in a combustion chamber having a piston bowl with fixed volume, according to an operating condition of the engine. For this purpose, a fuel injection amount is increased according to a rise of an engine load, the momentum of a fuel spray in the axial direction of a cylinder is increased, and also an increase rate of the momentum of a fuel spray in an axial direction of a cylinder is made greater than that of the fuel injection amount.